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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LY, NGHI H

ART UNIT	PAPER NUMBER
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2686

DATE MAILED: 06/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/804,475

Applicant(s)

AOKI ET AL.

Examiner

Nghi H. Ly

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 43 is/are allowed.
- 6) ☒ Claim(s) 1-3,6-12,14-27,29-35, 37-42 and 44 is/are rejected.
- 7) ☒ Claim(s) 4,5,13,28 and 36 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. Claim 44 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 44, it recites "an antenna for transmitting a carrier wave which forms a communication area from approximately right above a traveling course of the vehicle, wherein the antenna is mounted in the upper part of the vehicle."

Therefore, it is not clear to the examiner how one antenna could be mounted at two different places.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 6, 7, 23-26, 29, 30 and 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Endo et al (US 4,182,989).

Regarding claims 1, 25 and 44, Endo teaches a wireless communication system (see fig.4) comprising: a plurality of base stations (see fig.4, 114 and 114') separated from each other by a predetermined distance along a traveling route of a vehicle (see

fig.4, "500m" between two vehicles) and having respective communication areas (see fig.4, "communication areas No.1" and "communication areas No2"), and

a terminal station carried by a vehicle for wireless communication with the base stations when entering the communication areas of the base stations (see fig.4 antenna 118),

wherein each communication area of the base stations is sized to cover generally only one vehicle to exist therein and the communication areas are separated from one another without overlapping (see fig.4, each beam cover only one vehicle and separated by 500m).

Regarding claims 2 and 26, Endo further teaches the communication area has a greatest possible size which is incapable of covering a plurality of vehicles therein (see fig.4, each beam cover only one vehicle).

Regarding claims 6 and 29, Endo further teaches a width of the communication area of the base station in a widthwise direction of the traveling route is set based on a width of a traffic lane of the traveling route (see fig.1, "3.5m lane width").

Regarding claims 7 and 30, Endo further teaches the traveling route includes a plurality of traffic lanes so that a plurality of vehicles can travel side by side (see fig.1, two mobiles on two lanes), and a width of the communication area of the base station in a widthwise direction of the traveling route is set based on a width of one traffic lane (see fig.1, "3.5m lane width").

Regarding claim 23, Endo further teaches the base station has an array antenna having a plurality of antenna elements (see fig.4, antennas 102b, 102b', 12a and 12a').

Regarding claim 24, Endo further teaches the terminal station has an array antenna having a plurality of antenna elements (see fig.4, antennas 102b and 102b').

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 8-11 and 31-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Hassett et al (US 5,406,275).

Regarding claims 8-10 and 31-33, Endo teaches the plurality of traffic lanes is directly adjacent to each other (see fig.1, two lanes are adjacent to each other).

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Endo does not specifically disclose the communication area is formed such that the communication areas for the plurality of traffic lanes are displaced in a traveling direction so as not to abut each other in a widthwise direction of the traveling route.

Hassett teaches the communication area is formed such that the communication areas for the plurality of traffic lanes are displaced in a traveling direction so as not to abut each other in a widthwise direction of the traveling route (see fig.1 plurality of beams on plurality of traffic lanes).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Hassett into the system of Endo in order to provide method and systems for automatically determining the position of a mobile vehicle approaching a stationery transceiver (see Hassett, column 2, lines 40-45).

Regarding claims 11 and 34, Endo further teaches the base station transmits the carrier wave from approximately right above the traffic lane (see fig.1, the base station 106 transmits the carrier wave from approximately right above the traffic lane 103).

6. Claims 3 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Kane et al (US 6,130,626).

Regarding claims 3 and 27, Endo teaches claims 21 and 25. Endo does not specifically disclose the data is dividedly transmitted in the communication areas of the base stations existing along a traveling direction of the vehicle in case that transmission

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of the data to the terminal station is not completed within the communication area of each base station.

Kane teaches the data is dividedly transmitted in the communication areas of the base stations existing along a traveling direction of the vehicle in case that transmission of the data to the terminal station is not completed within the communication area of each base station (see column 17, lines 45-54).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Kane into the system of Endo so that the mobile unit can receive data without interruption.

7. Claims 12 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Tsuji (JP 404105083A).

Regarding claims 12 and 35, Endo teaches claims 1 and 25. Endo does not specifically disclose the base station transmits the carrier wave for forming the communication area to an area where a frequency of the carrier wave received by the terminal station of the vehicle moving on the traveling route does not vary in discontinuity by means of Doppler effect.

Tsuji teaches the base station transmits the carrier wave for forming the communication area to an area where a frequency of the carrier wave received by the terminal station of the vehicle moving on the traveling route does not vary in discontinuity by means of Doppler effect (see Constitution).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Tsuji into the system of Endo so that Doppler effect can be eliminated.

8. Claims 14-19 and 37-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Lee (US 5,504,936).

Regarding claims 14-19 and 37-42, Endo teaches claims 1 and 25. Endo does not specifically disclose the plurality of base stations is connected to one control station through optical transmission line and the control station is connected to a wire communication network at the outside, the control station receives, in down-link direction, a wire communication signal addressed to the terminal station from an outside and generates a base band signal by converting the wire communication signal and converting the base band signal into a high frequency signal, and thereafter modulates it to a light signal to transmit to the base station, and the base station converts the light signal transmitted from the control station into an electrical signal to extract the high frequency signal, and transmits the extracted high frequency signal to the terminal station.

Lee teaches the plurality of base stations is connected to one control station through optical transmission line and the control station is connected to a wire communication network at the outside (see fig.2 zone site 123-126 and see column 1, lines 54-57), the control station receives, in down-link direction, a wire communication signal addressed to the terminal station from an outside and generates a base band

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signal by converting the wire communication signal and converting the base band signal into a high frequency signal, and thereafter modulates it to a light signal to transmit to the base station (see column 1, lines 54-57 and see column 6, lines 56-67), and the base station converts the light signal transmitted from the control station into an electrical signal to extract the high frequency signal and transmits the extracted high frequency signal to the terminal station (also see column 1, lines 54-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Lee into the system of Endo in order to reduce interference by RF signals.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Chung et al (US 6,359,871).

Regarding claim 20, Endo teaches claims 1. Endo does not specifically disclose the plurality of base stations are connected with the control station in a star type.

Chung teaches the plurality of base stations are connected with the control station in a star type (see column 2, lines 15-16).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Chung into the system of Endo so that data could be transmitted faster.

10. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Foster et al (US 5,918,181).

Regarding claim 21, Endo teaches claims 1. Endo does not specifically disclose the plurality of base stations are connected with the control station in a bus network type.

Foster teaches the plurality of base stations are connected with the control station in a bus network type (see column 5, lines 59-62).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Foster into the system of Endo in order to increase the speed of the transmission.

11. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Endo et al (US 4,182,989) in view of Foster et al (US 5,918,181) and further in view of Lee (US 5,504,936).

Regarding claim 22, the combination of Endo and Foster teaches claims 21.

The combination of Endo and Foster does not specifically disclose the optical transmission between the plurality of base stations and the control station uses wavelength division multiplex type that multiplexes divisionally by differing wavelengths of a transmission light according to each base station.

Lee teaches the optical transmission between the plurality of base stations and the control station uses wavelength division multiplex type that multiplexes divisionally by differing wavelengths of a transmission light according to each base station (see column 1, lines 54-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the above teaching of Lee into the system of Endo and Foster in order to reduce interference by RF signals.

Allowable Subject Matter

12. Claims 4, 5, 13, 28 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 4, the combination of Endo et al (US 4,182,989) and Kane et al (US 6,130,626) teaches the communication system of claim 3.

Endo and Kane, alone or in combination, fails to teach the data storage means has a data storage capacity which is more than a value $R \times T$ which is a product of R and T , R representing a data rate used for transmission of the data at the terminal station and $T (= L / v)$ representing non-data transmission time determined by a velocity v at which the terminal station moves between adjacent communication areas divisionally transmitting the data and the distance L between the adjacent communication areas.

Regarding claim 28, the combination of Endo et al (US 4,182,989) and Kane et al (US 6,130,626) teaches the communication system of claim 27.

Endo and Kane, alone or in combination, further fails to teach the number of communication areas of the base stations along the traveling route satisfies the following condition,

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(condition) ... $E > \text{RaREQ} / \text{RaSA}$

where E is an effective communication section ratio, RaREQ is a data transmission rate necessary for utilizing the data without interruption at the terminal station, and RaSA is the data transmission rate from the base station to the terminal station.

Regarding claims 13 and 36, Endo et al (US 4,182,989) teaches claim 1 and the combination of Endo et al (US 4,182,989) and Tsuji (JP 404105083A) teaches the communication system of claim 35.

Endo and Tsuji, alone or in combination, further fails to teach the number of communication areas of the base stations on the traveling route is set to satisfy the following condition,

(condition) ... $E > 10^{\{-(\text{GtSA}-\text{GtCN})/10\}}$

where E is an effective communication section ratio, GtSA is an antenna gain of the base station and GtCN is an antenna gain of the base station of continuous access method in which the communication areas overlap with each other, with "[^]" in the above expression being the power of numeric value before "[^]" to the number of times of the numeric value after "[^]".

13. Claim 43 is allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 43, Endo et al (US 4,182,989) teaches a terminal station carried by a vehicle for wireless communication with a plurality of base stations (see fig.4, 114 and 114') separated from each other by a predetermined distance along a traveling route of the vehicle (see fig.4 "500m").

Kane (US 6,130,626) teaches the terminal station is capable of divisionally receiving given data from the plurality of base stations (see column 17, lines 45-54) and the terminal station comprising: data storage means for accumulating the data transmitted divisionally from the base stations (see column 2, lines 13-19).

Endo and Kane, alone or in combination, fails to teach the data storage means has a data storage capacity which is more than a value $R \times T$ which is a product of R and T , R representing a data rate used for transmission of the data at the terminal station and $T (= L / v)$ representing non-data transmission time determined by a velocity v at which the terminal station moves between adjacent communication areas divisionally transmitting the data and the distance L between the adjacent communication areas.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Nelson (US 6,470,182) teaches mobile station roaming in a multiple service provider area.

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b. Shoobridge (US 6,236,926) teaches method of operating a wireless and a short-range wireless connection in the same frequency.

c. Hengeveld (US 6,330,447) teaches method for maintaining reliable communication in a wireless communication system.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nghi H. Ly whose telephone number is (703) 605-5164. The examiner can normally be reached on 8:30 am-5:30 pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on (703) 305-4379. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Nghi H. Ly

[Handwritten signature]

11/07/03

Marsha D Banks-Harold
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